

1200V, 40A COMMON CATHODE SILICON CARBIDE SCHOTTKY DIODE

FEATURES

- ▲ 1.2 kV Schottky Rectifier
- ▲ Maximum Operating Junction Temperature 175°C
- ▲ Zero Reverse and Forward Recovery
- ▲ Fast and Temperature-independent Switching
- ▲ Positive Temperature Coefficient on V_F

ADVANTAGES AND BENEFITS

- ▲ Extremely Low Standby and Switching Power Losses
- ▲ Higher Efficiency than when using Si Diodes
- ▲ High Frequency Operation
- ▲ Very Low Heat Sink Requirements
- ▲ Paralleling of Devices Without Thermal Runaway

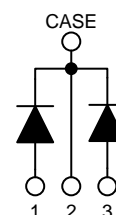
APPLICATIONS

- ▲ Rectification, Boost and Free Wheeling
- ▲ Switching Mode Power Supplies (SMPS)
- ▲ Battery chargers (EV, OBC, computers)
- ▲ Power Factor Correction (PFC)
- ▲ Uninterruptible Power Supplies (UPS)
- ▲ High Voltage Multipliers
- ▲ Induction Heating

KEY PERFORMANCE

Parameter	Value
V_{RRM}	1200V
I_F	20 / 40A
Q_C	94 / 188nC

PACKAGING



QUICK ORDERING INFORMATION

Part Number	Package	Marking
KE12DJ40DT47	TO-247 (3L)	KE12DJ40D

Other packages and packaging configurations possible upon request.

ABSOLUTE MAXIMUM RATINGS

Unless otherwise stated, specification applies for $T_C=25^\circ\text{C}$.

Parameter	Symbol	Values	Unit	Note/Test Condition
DC Blocking Voltage	V_R	1200	V	
Repetitive Peak Reverse Voltage	V_{RRM}	1200	V	
Surge Peak Reverse Voltage	V_{RSM}	1200	V	
Continuous Forward Current	I_F	35*/70** 20*/40**	A	$T_C=125^\circ\text{C}$ $T_C=155^\circ\text{C}$
Repetitive Peak Forward Surge Current	I_{FRM}	140* 126*	A	$T_C=25^\circ\text{C}$, $t_p=10\text{ms}$ half sinewave $T_C=110^\circ\text{C}$, $t_p=10\text{ms}$ half sinewave
Non-repetitive Peak Forward Surge Current	I_{FSM}	180* 160*	A	$T_C=25^\circ\text{C}$, $t_p=10\text{ms}$ half sinewave $T_C=110^\circ\text{C}$, $t_p=10\text{ms}$ half sinewave
Power Dissipation	P_{tot}	300*/600** 100*/200**	W	$T_C=25^\circ\text{C}$ $T_C=110^\circ\text{C}$
i^2t value	$\int i^2 dt$	162* 128*	A ² s	$T_C=25^\circ\text{C}$, $t_p=10\text{ms}$ half sinewave $T_C=110^\circ\text{C}$, $t_p=10\text{ms}$ half sinewave
Operating Temperature Range	T_J	-55 to +175	°C	
Storage Temperature Range	T_{STG}	-55 to +175	°C	

* Per Leg

**Per Device

Caution: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur, and reliability may be affected.

ELECTRICAL CHARACTERISTICS

 Unless otherwise stated, specification applies for $-55^{\circ}\text{C} < T_J < 175^{\circ}\text{C}$.

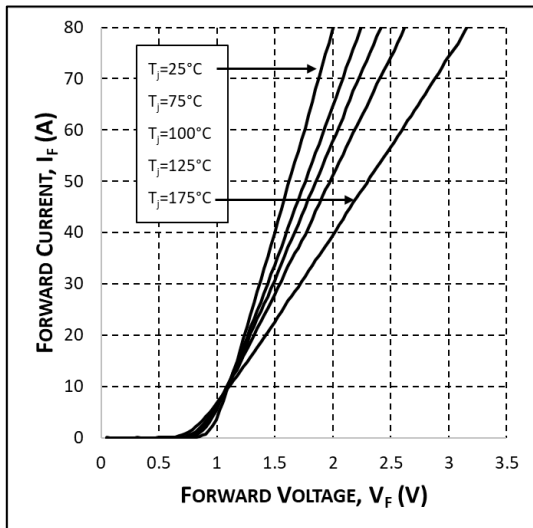
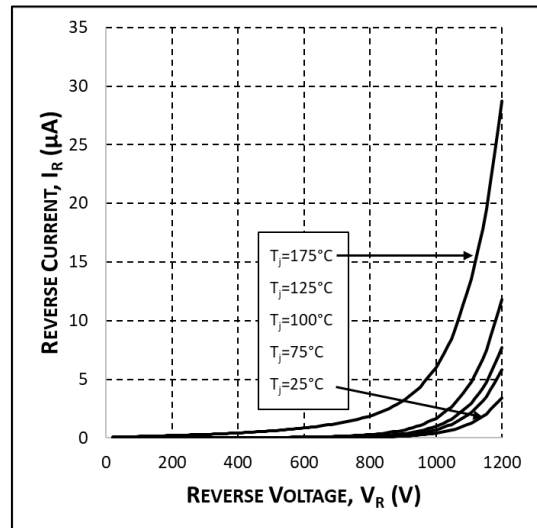
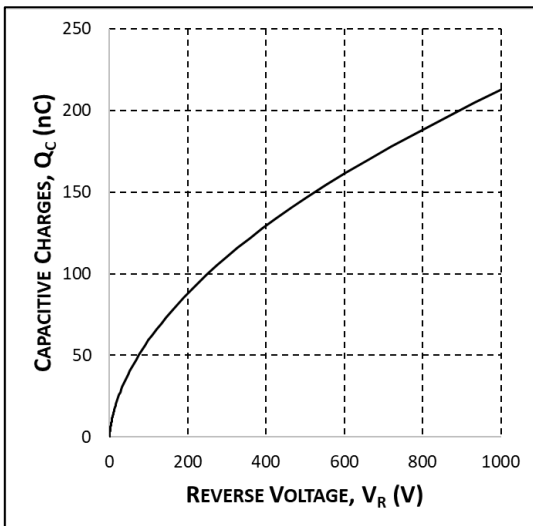
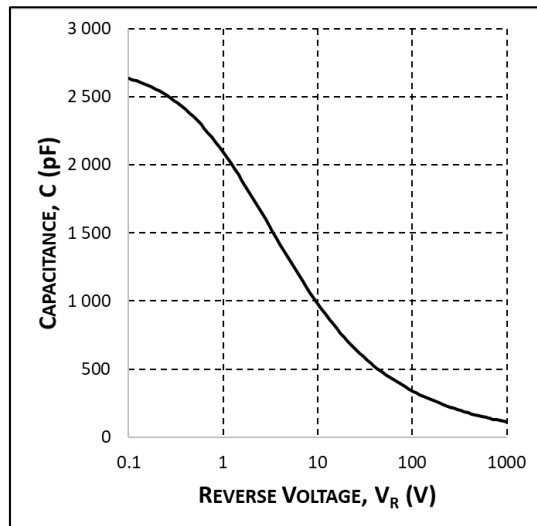
Parameter	Symbol	Value		Unit	Note/Test Condition
		Typ	Max		
Forward Voltage	V_F	1.5 2.1	1.8	V	$I_F=40\text{A}^{**}$, $T_J=25^{\circ}\text{C}$ $I_F=40\text{A}^{**}$, $T_J=175^{\circ}\text{C}$
Reverse Current	I_R	4** 80**	200 800	μA	$V_R=1200\text{V}$, $T_J=25^{\circ}\text{C}$ $V_R=1200\text{V}$, $T_J=175^{\circ}\text{C}$
Total Capacitive Charge	Q_C	188**		nC	$V_R=800\text{V}$, $T_J=25^{\circ}\text{C}$, $Q_C(V_R) = \int_0^{V_R} C(V)dV$
Total Capacitance	C	2640** 180** 128**		pF	$V_R=0.1\text{V}$, $T_J=25^{\circ}\text{C}$, $f=1\text{MHz}$ $V_R=400\text{V}$, $T_J=25^{\circ}\text{C}$, $f=1\text{MHz}$ $V_R=800\text{V}$, $T_J=25^{\circ}\text{C}$, $f=1\text{MHz}$
Capacitance Stored Energy	E_C	40**		μJ	$V_R=800\text{V}$, $T_J=25^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Parameter	Symbol	Values Typ	Unit	Note/Test Condition
Thermal Resistance from J-C	$R_{\theta JC}$	0.5*/0.25**	$^{\circ}\text{C/W}$	

* Per Leg

**Per Device

TYPICAL PERFORMANCE

Fig 1. Typical Forward I-V characteristics

Fig 2. Typical Reverse I-V characteristics

Fig 3. Total Capacitive Charges vs. Reverse Voltage

Fig 4. Capacitance vs. Reverse Voltage

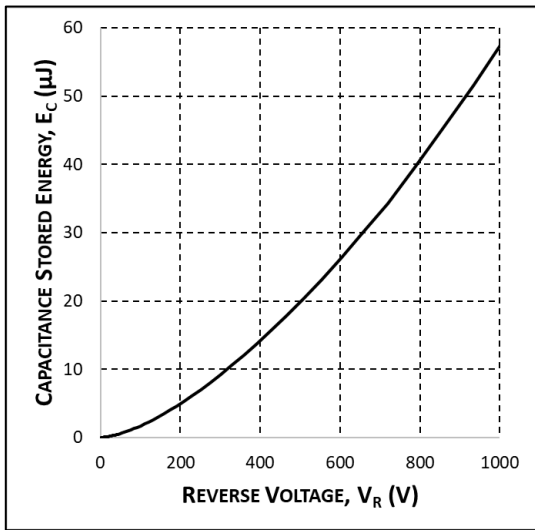


Fig 5. Typical Capacitance Stored Energy vs. Reverse Voltage

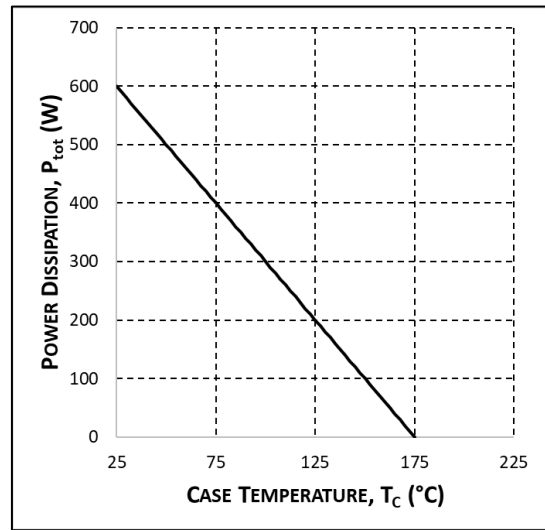
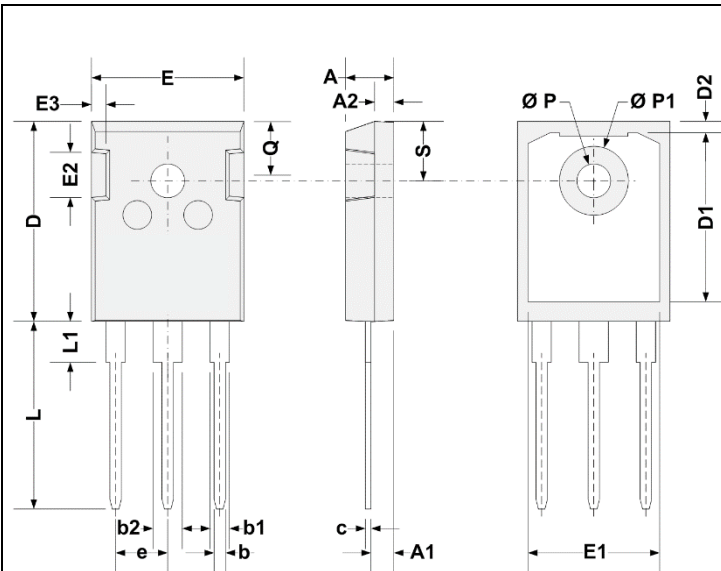


Fig 6. Power Derating

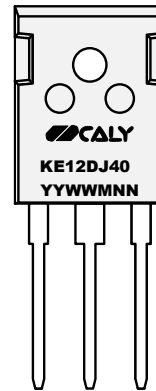
PACKAGE OUTLINES

TO247-3LD



M3 Screw: 1Nm (8.8lbf-in)

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	0.190	0.205
A1	2.29	2.54	0.090	0.100
A2	1.91	2.16	0.075	0.085
b	1.07	1.32	0.042	0.052
b1	1.88	2.13	0.074	0.084
b2	2.92	3.20	0.115	0.126
c	0.51	0.66	0.020	0.026
D	20.80	20.90	0.819	0.823
D1	16.56	17.83	0.652	0.702
D2	0.51	1.35	0.020	0.053
E	15.49	16.26	0.610	0.640
e	5.44 BSC		0.214 BSC	
E1	13.46	14.02	0.530	0.552
E2	4.27	4.52	0.168	0.178
E3	1.40	1.65	0.055	0.065
L	19.30	19.81	0.760	0.780
L1	4.14	4.39	0.163	0.173
Ø P	3.51	3.56	0.138	0.140
Ø P1	7.06	7.32	0.278	0.288
Q	5.46	5.64	0.215	0.225
S	6.15 BSC		0.242 BSC	

PRODUCT MARKING


Part Number	Marking
KE12DJ40DT47	KE12DJ40

Part Number:

K
↓

Source
K = CALY Technologies

E
↓

Temperature range:
E = -55°C to +175°C

12
↓

Rated Voltage:
12 = 1200V

DJ
↓

Device / Type
DJ = Diode / Schottky

20D
↓

Rated Current:
40D = Dual 10A (40A)

T47
↓

Package:
T = TO247

Unique Lot Assembly Code:

YY	Last two digits of assembly year (e.g. 16 = 2016).
WW	Assembly week (01 to 52).
M	Assembly location code.
NN	Assembly lot code (01 to 99).

REVISION HISTORY

Revision	Date	Description
1A	2020-07-03	First issue
1B	2020-08-21	Correct table "Electrical characteristics", page 2, 3rd line (Reverse Current), 2nd test condition temperature $T_j=25^\circ\text{C}$ to $T_j=175^\circ\text{C}$
1C	2021-02-04	Correct packaging picture page 1 (2 terminals to 3 terminals).

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